1. A method for making an epitaxial germanium temperature sensor, comprising:

depositing an epitaxial germanium layer onto a substrate by chemical vapor deposition (CVD); and

doping the layer during the vapor phase of the CVD process to a dopant concentration selected so that at temperatures below about 4K, resistivity of the layer is due to hopping conduction of free carriers.

2. The method of claim 1, wherein the epitaxial germanium layer is deposited to a thickness of 2 microns.

3. The method of claim 1, wherein the doping step includes doping the epitaxial germanium with arsenic (AsH_3).

4. The method of claim 1, wherein the doping step includes doping the epitaxial germanium with arsenic compensated with boron (AsH_3/B_2H_6).

5. The method of claim 1, wherein the substrate is selected from a group consisting of silicon, germanium, sapphire and diamond.

6. The method of claim 1, wherein the depositing step creates an epitaxial germanium layer having a thickness in the range from about 450 angstroms to about 500 microns.

7. The method of claim 1, wherein the depositing step creates an epitaxial germanium layer having a doped hetero-epitaxial layer.

8. The method of claim 7, wherein said doped hetero-epitaxial layer is selected from a group consisting of an epitaxial layer of germanium on silicon, an epitaxial layer of germanium on carbon, and an epitaxial layer of germanium on an insulating material.

9. The method of claim 1, wherein the dopant in the doping step comprises a donor selected from a group consisting of arsenic (AsH_3), phosphorus and antimony.

10. The method of claim 3, wherein said arsenic (AsH_3) has a concentration of $2.0x10^{16}$ cm^{-3}.

11. The method of claim 4, wherein the dopant in the doping step has an arsenic concentration of 2.0×10^{16} cm^{-3} and a boron concentration of 7.2×10^{16} cm^{-3}.

12. The method of claim 1, wherein the dopant in the doping step has a donor concentration that makes said layer of epitaxial germanium resistive.

13. The method of claim 1, wherein the dopant in the doping step comprises a compensating acceptor impurity selected from a group consisting of boron and gallium.